

India

India's cloud services market has generated excitement among U.S. technology leaders and optimistic predictions for the future. While there are compelling reasons for this sanguine outlook, India also presents challenges in terms of security concerns, infrastructure, and other areas. Nevertheless, the market's current growth rates and significant potential are clear, earning India its 8th place ranking.

Overall
Rank

8

In recent months, various U.S. cloud industry executives have visited India and declared its importance to their success. This comes as no surprise given that over 250 million Indians today use web-connected devices, which generally rely on cloud services for applications and other functionality.¹ As Internet access, e-commerce, mobile device and application usage, and business adoption continue to expand, the growth in cloud-related spending in India should outpace that in the rest of the world.² Research firm Gartner believes that by 2018 public cloud spending in India will reach nearly \$2 billion, from \$638 million in 2014.³ From 2013 to 2014 alone, the firm's figures demonstrate a rise of about 34 percent. Other estimates are similarly upbeat, such as the \$3.5 billion technology research group IDC predicts will be spent on cloud services in total in India by 2016 – growth of over 400 percent from the 2012 level.⁴ Finally, Forrester expects the software-as-a-service (SaaS) market in particular to roughly double in value between 2014 and 2020, when it will be worth \$1.2 billion.⁵

Besides deeper Internet penetration and smartphone adoption, a key driver of these optimistic forecasts is widespread interest among business customers, across several industries, in all types of cloud-related services.⁶ One cloud adoption survey found that 96 percent of businesses queried either used cloud services or planned to begin doing so in 2015 (although other sources indicate that actual adoption rates are much lower).⁷ It is also common for business customers to use multiple cloud vendors for their SaaS, infrastructure-as-a-service (IaaS), and platform-as-a-service (PaaS) applications.⁸ Consequently, by 2018 Indian spending will reach \$735 million for SaaS (from \$249 million in 2014), \$295 million for IaaS (from \$77 million), and demonstrate strong gains in sub-sectors like PaaS and business-process-as-a-

service as well, according to Gartner.⁹ Cloud vendors attempting to win a share of this spending have the opportunity to develop offerings that cater to the needs of a wide variety of industry segments, such as pharmaceuticals, healthcare, fast-moving consumer goods, and financial services.

U.S. cloud providers are clearly enthusiastic about the opportunities presented by India. Firms like IBM and Microsoft (which saw its commercial cloud revenue in the country double in 2013-14) have committed to having or already launched local data centers. Amazon founder Jeff Bezos has said that his firm is also evaluating the prospects for an Indian data center.¹⁰ These efforts are a bid to improve technical performance, and perhaps more importantly, better appeal to customers for whom regulatory restrictions on data location have thus far limited cloud adoption.^{11, 12, 13, 14}

Whether they have a physical presence or not, various cloud suppliers are today actively competing with each other for India's fast-rising cloud spending. Their strengths and areas of focus differ slightly, with Amazon Web Services' (AWS) adoption driven by business demand for public cloud services, Microsoft's growth propelled by SaaS offerings, and IBM focusing on private cloud.^{15, 16}

Elements of cloud vendor competition seen in other markets, such as heavy advertising and aggressive price cuts by Amazon, exist in India.^{17, 18} Google, Microsoft, and IBM are also aggressively competing to attract startups through "cloud credit" programs.¹⁹ As of August 2014, Amazon had signed up over 8,000 Indian firms to AWS, while Microsoft has said it is adding 2,000 new cloud customers per month.²⁰ Other foreign companies with a presence in this fast-growing

and competitive market include HP, Red Hat, SAP, and Oracle.²¹

Despite optimistic predictions and clear interest from global players, however, a variety of challenges have held India's cloud potential back even as adoption continues growing. These have contributed to a situation in which, regardless of significant awareness, most large Indian enterprises are not thought to host more than 15 percent of their ICT processes in the cloud.²² For example, while analysts have long predicted a boom in the country's cloud market, in 2013 issues such as a flagging currency (which artificially shrank budgets for foreign ICT services) and pre-general election reluctance among government departments to make new ICT-related investments likely slowed growth.²³

A more ongoing problem is the country's Internet infrastructure (i.e., bandwidth constraints and fiber optic weaknesses) and the inconsistency of its power supply in some areas.²⁴ According to the United Nations, India meets the minimum Internet infrastructural standards necessary for only basic cloud services, with bottlenecks impacting download speeds, upload speeds, and network latency.²⁵ Further, the World Economic Forum ranked India a dismal 111th out of 148 countries for the availability of international Internet bandwidth, a measure of the amount of Internet traffic that can be exchanged between countries.²⁶ Various other rankings and indicators focused on Internet penetration, cloud readiness, and other factors confirm a sub-optimal state of affairs which, combined with ongoing shortfalls in the steady electricity supply needed for data center operations, is likely to continue putting some limits on cloud growth.

Fortunately, the government is acutely aware of these challenges, and its ambitious Digital India program aims to address some of the infrastructural weaknesses, though it remains to be seen if this will lead to significant improvements.²⁷ Moreover, the interest expressed by major cloud providers in establishing Indian data centers suggests that the electricity situation is either improving or they are becoming better at managing it. For example, some firms have implemented redundant power equipment setups and even rooftop solar panels to ensure an adequate supply.^{28, 29} Placing data centers in areas with more consistent power capacity and better Internet infrastructure is another possible step.³⁰

Another key issue relates to security concerns, especially around the use of foreign providers. While there is great interest in cloud-based solutions, misgivings remain about whether cloud services (and particularly public cloud) can ensure adequate protection of sensitive information.³¹ Industry participants report that current adoption focuses on non-critical business workloads and SaaS applications unlikely to host particularly sensitive data, although "people are not as hesitant as they used to be" when it comes to cloud deployments overall, according to one industry expert.³² In some sectors with traditionally large IT budgets (e.g., financial services, telecommunications) an especially strong emphasis on data security or regulations mandating domestic storage of customer data limit interest in cloud usage, especially with a foreign provider.³³

India also presents a mixed policy environment for cloud services. Some elements of the environment remain undefined (e.g., India lacks a formal data breach notification rule), while others are clearly positive (e.g., there do not appear to be tariffs on software downloads) and some negative (e.g., government procurement, which though a major source of IT spending is reportedly a complex, multifarious process).^{34, 35}

Citing the need to monitor domestic Internet traffic for national security reasons, concerns over foreign surveillance, and a desire to ensure that data is subject to local laws, the Indian government has for years supported the idea of foreign firms storing data within the country.³⁶

One clear example of the push for data localization is found in the Department of Telecommunications' "National Telecom M2M Roadmap" (referring to machine-to-machine data transmission of the sort expected to increase substantially as Internet-connected devices become more common), posted in English in January 2015.³⁷ The guidelines call for "all M2M gateways and application servers" used in providing services to individuals in India to be physically located within the country, based on national security concerns. Although cloud vendors would not be the explicit focus of this provision, its inclusion points to the acceptance of data localization policies among some in the Indian government.

In the lead-up to the 2014 general elections, Bharatiya Janata Party (BJP) members also spoke about the possible need to enact measures like these to ensure

that Internet companies adhere to Indian laws and cultural expectations.³⁸ Further, Indian ISPs have cited privacy concerns in lobbying the government to require data localization.³⁹ With the BJP's electoral victory, it seems likely that additional rules may be

introduced. These measures would be in line with policies on domestic data routing proposed by India in other forums and with the Modi government's recent moves to exert greater control over some online content.^{40, 41, 42}



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